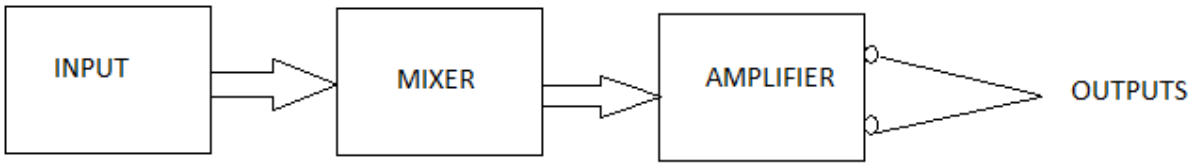
Requirements Capture
Desktop Audio System

Advisor: Dr. Jacob Glower
Group: SD1014
Group members: Andrew Lynch, Kamal Sanghi, Chris Grahn
Capture date: 9/24/2010

The intent of this project is to create a desktop audio system for consumer use. The device will take 4 devices (two computers and two analog audio sources), mix them together, and amplify their output to speakers and headphones. The target consumer is pro audio and “pro-sumer” computer users. The product takes 3 usually discrete components and combines them into one “box”, eliminating clutter and complexity.

Characteristics of Product

- Modular - designed in 3 parts: a mixer, an input system (USB->Analog audio), and an amplifier for output. Systems will be independent in design and function.
- Mixer
  - Use digital potentiometers to vary volume levels of 4 analog stereo inputs.
  - Singular analog stereo output
  - The mixing will be controlled by an MCU (microcontroller) to operate the digital potentiometers. It will also provide the human interface (LCD and encoders).
  - Mute function for each channel within the mixer.
  - Input should be +/- 2.5v
- Input system
  - Utilize USB to Analog conversion: Connect to a computer via USB and provide an analog stereo output.
  - Should output 4 stereo channels to be the input for the mixer.
  - Provide amplification to bring levels to +/- 2.5v
- Amplifier
  - Take in one +/- 2.5v stereo signal
  - Output two different levels, one for headphones, and one for unpowered speakers.
  - Power-less bypass for using powered speakers
  - 12V power input - to drive speakers



Existing products

- Mixing boards
    - These only provide analog (manual) mixing of channels, and typically do not have amplifiers. They also don't have USB to Analog converters built in.
- Amplifiers with mixers
    - Amplifier with a simple two or three channel mixer embedded in one package.
    - These still don't provide USB->Analog conversion, and can be two channels instead of four.
- USB->Audio converters
    - Standalone products exist, but the intent is to make a product that will perform all three stages in one package.